

REMARKS

Applicants courteously solicit reconsideration and allowance. Applicants suggest that the non-elected claims be re-joined and all pending claims allowed. In the alternative, cancellation of non-elected claims in an Examiner's Amendment to place elected claims in condition to receive a notice of Allowance is solicited.

A copy of *In re Cofer*, 148 USPQ 268 (CCPA 1966) is presented in the Appendix.

TRAVERSING THE REJECTIONS

Applicants traverse the rejection of claims 1-3 and 5-7 under 35 USC 103(a) over U.S. Patent No. 6,559,231 B1 ("Hasegawa") or over U.S. Patent No. 6,645,617 B1 ("Okazaki").

Applicants respectfully submit there is **no** *prima facie case* of obviousness. Applicants' respectfully submit their claims must be considered as a whole, and that such claims would not have been obvious to a person of ordinary skill in the art over either the Hasegawa or the Okazaki references. The differences between the claimed inventions and the remainder of the claims – "the inventions as a whole" – manifestly support this conclusion for the reasons presented hereinbelow.

A. The claims define unobvious inventions over the Hasegawa reference.

Applicants submit their claims 1-3 and 5-7 define unobvious inventions over the Hasegawa reference, U.S. Patent No. 6,559,231B1.

1. **Hasegawa exemplifies coating agents, not energy beam curable adhesive compounds/compositions.**

At the beginning, it appears the rejection requires a selection from the choices presented in the Hasegawa reference.

Hasegawa describes a broad genus of copolymer (I), which is cited in the rejection in the prior appeal. According to the various Office Actions herein, a formula at column 2, lines 40-50 in which, for the sake of argument, the disclosed R1 and R2 can be alkyl or hydrogen allegedly anticipates the claims. Applicants point out the formula itself describes, for the sake of argument, cases (i) R1 and R1 are both hydrogen, (ii) R1 is an alkyl and R2 is an alkyl, (iii) one of R1 or R2 is alkyl while the other is hydrogen, or (iv) R1 and R2 form a ring.

Specifically, Hasegawa only exemplifies the case (iv) in the working Examples (see column 18, Formula (11)) for coating agents even though Hasegawa generally discloses various applications (see column 16, lines 24-32).

Applicants' specification describes an embodiment of the present invention in Examples 1-11, and describes results obtained with the structurally divergent copolymer (Hasegawa, case (iv)) at page 42 of the present specification in the Comparative Example 1. Applicants' evidence shows that their exemplified embodiment (Examples 1-11) is superior to the Hasegawa embodiment (case (iv), Comparative Example 1) in SAFT (shear adhesion failure temperature), which is important for pressure sensitive adhesives (see page 47, Table 1 of the present specification).

Hasegawa therefore does not specifically exemplify a pressure-sensitive adhesive composition or a pressure-sensitive adhesive sheet that contains a compound of the formula in which one of R1 and R2 is alkyl and the other hydrogen.

Hasegawa only exemplifies a copolymer that contains the maleimide group falling under the single case (iv) in which R1 and R2 form a ring. Haswgawa's exemplified copolymer is a high molecular weight solid, not a liquid at ordinary temperature.

Even if the 'formula' in Applicants' independent claim 1 and independent claim 5 were teased from the Hasegawa disclosure, the claims are not to a formula but are to a pressure-sensitive adhesive (claim 1) and to a pressure-sensitive adhesive sheet (claim 5) in which the compound recited is liquid at ordinary temperature and has a number average molecular weight of 2,000 to 20,000.¹

**2. Applicants' liquid materials would have
been unobvious over Hasegawa solid materials.**

Applicants' liquid materials would not have been suggested by the Hasegawa liquid materials. This follows from *In re Cofer*, 148 USPQ 268 (CCPA 1966).

A liquid material is different than a solid material. The two are not the same, nor has the Examiner provided evidence to prove the latter have suggested the former.

¹ Applicants' submit the difference in physical properties is relevant. It refutes what appears to be an inherency argument in the Office Actions. As explained more than a generation ago,

From the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing. The graphic formulae, and the chemical nomenclature, the systems of classification and study such as the concepts of homology, isomerism, etc., are mere symbols by which compounds can be identified, classified, and compared. But a formula is not a compound and while it may serve in a claim to identify what is being patented, as the metes and bounds of a deed identify a plot of land, the thing that is patented is not the formula but the compound identified by it.

In re Papesch, 315 F.2d 381, 391, 137 U.S.P.Q. (BNA) 43, 51 (CCPA 1963).

Accordingly, if the Examiner wishes to maintain either of the rejections in the September 6, 2007 Office Action, the Applicants respectfully call for an affidavit of the Examiner as per the requirements of 37 CFR §104(d)(2).²

Applicants again invite the examiner's attention to page 5, line 21 and the specification, page 35, last paragraph (the compound having maleimide groups is liquid at ordinary temperature), as examples.

Applicants' pressure-sensitive adhesive composition and pressure-sensitive adhesive sheets contain maleimide compounds that are liquid at ordinary temperature. Specification, page 7, lines 22-23. Ordinary temperature can be approximately room temperature, and can be referred to as 25°C. Specification, page 8, lines 2-4.

Since the compounds are liquid at ordinary temperature, it is easier to handle such compounds in coating operations. Specification, page 7, lines 23-24; page 35 lines 23-24.

On the other hand, compounds that are solid at room temperature are not easy to handle, and additionally, lead to a high elastic modulus of the cured film and thus to insufficient adhesive performance. Specification, page 7, line 24 to page 8, line 2.

a. **Appellants' Claims recite the compound is liquid at ordinary temperature.**

Applicants' claims 1-3 relate to a pressure sensitive adhesive in which the maleimide compound is liquid at ordinary temperature. Independent claim 1 recites "[a] pressure-sensitive adhesive curable with an active energy beam, comprising a compound which has two or more

² "When a rejection in an application is based on facts within the personal knowledge of an employee of the office, the data shall be as specific as possible, and the reference must be supported, when called for by the applicant, by the affidavit of such employee, and such affidavit shall be subject to contradiction or explanation by the affidavits of the applicant and other persons."

maleimide groups represented by the following formula (1) and is liquid at ordinary temperature..." (emphasis added).

Applicants' claims 5-7 relate to a pressure sensitive adhesive sheet in which the maleimide compound is liquid at ordinary temperature. Independent claim 5 recites "[a] pressure-sensitive adhesive sheet, comprising a substrate and a pressure-sensitive adhesive layer formed on the substrate by coating onto the substrate a pressure-sensitive adhesive curable with an active energy beam, and irradiating said coating with an active energy beam to crosslink or cure said coating," and further recites a maleimide compound that is "and is liquid at ordinary temperature." (emphasis added).

b. Hasegawa relates to solid not liquid materials.

Hasegawa relates to and exemplifies solid materials, *not* liquid materials. Hasegawa appears to disclose that the maleimide copolymer (I) has a number average molecular weight falling in a range of usually 1,000 to 1,000,000 (*see* col. 7, lines 9-12), but the maleimide copolymers disclosed in Hasegawa's working examples are all solid at ordinary temperature.

The Hasegawa maleimide copolymers (I) are described in the Production Examples and their respective the glass transition temperature (T_g) can be calculated on the basis of Table 1 of column 18, as shown below:

Calculation method of T_g:

$$1/T_g = CA/T_{gA} + CB/T_{gB} + \text{-----} + CX/T_{gX}$$

in which CA, CB ---- and CX are weight fractions of components A, B ---- and X respectively, provided that CA + CB + ---- + CX = 1, and T_{gA}, T_{gB} ---- and T_{gX} are T_gs (°K) of homopolymers of components A, B ---- and X respectively.

The calculated Tg's of the copolymers A-1, A-2, A-3 and A-4 from Hasegawa's Table 1 are as follows:

	Constituent monomers (parts)						Tg (°C)
	MIA	DAA	BMA	MMA	BA	MA	
A-1	10	5	50	20	14	1	26.6
A-2	10	10	45	20	14	1	29.1
A-3	10	5	50	20	14	1	26.6
A-4	10	0	55	20	14	1	24.1

MIA: Imide acrylate of formula (11) of Hasegawa (65°C (338°K)),

DDA: Diacetoneacrylamide (77°C (350°K)),

BMA: n-Butyl methacrylate (20°C (293°K)),

MMA: Methyl methacrylate (105°C (378°K)),

BA: n-Butyl acrylate (-54°C (219°K)),

MA: Methacrylic acid (130°C (403°K)).

Applicants submit that it appears from the above Table, the Tg's of Hasegawa's copolymers A-1, A-2, A-3 and A-4 are all near ordinary temperature.

Applicants therefore submit the copolymers of the working examples of Hasegawa are not liquid at ordinary temperature.³

**3. Hasegawa would not have suggested Applicants
Applicants' claimed molecular weight ranges.**

Appellants' range of number average molecular weight is another claim recitation that establishes novelty and obviousness over the Hasegawa reference.

³ Applicants submit the Office Action has not presented a factual basis for obviousness, whether express or predicated on some inherency theory. There is *no* factual predicate to show Hasegawa disclosed the compound, disclosed the compound is liquid, or, for instance, disclosed that the compound has a number average molecular weight according to Applicants' claims.

**a. Appellants' claims recite a novelty-conferring 2,000 to 20,000
molecular weight range.**

Claims 1 and 5 include a number average molecular weight range that is not described in the Hasegawa reference, and these claims would not have been obvious under 35 U.S.C. 103(a).

Applicants' independent claim 1 recites "[a] pressure-sensitive adhesive curable with an active energy beam, comprising a compound which has two or more maleimide groups represented by the following formula (1) and is liquid at ordinary temperature..., and wherein said compound has a number average molecular weight of 2,000 to 20,000." (emphasis added).

Applicants' independent claim 5 recites "[a] pressure-sensitive adhesive sheet, comprising a substrate and a pressure-sensitive adhesive layer formed on the substrate by coating onto the substrate a pressure-sensitive adhesive curable with an active energy beam, and irradiating said coating with an active energy beam to crosslink or cure said coating," and further recites a maleimide compound that is "and is liquid at ordinary temperature ..., and wherein said compound has a number average molecular weight of 2,000 to 20,000." (emphasis added).

The molecular weight of the maleimide compound is preferably 2,000 to 20,000 in terms of number average molecular weight. Specification, page 8, lines 5-6. When the number average molecular weight is less than 2,000, the pressure-sensitive adhesive strength and tackiness of a cured film are lowered. Specification, page 8, lines 8-11. On the other hand, when the number average molecular weight is too high, the viscosity of the adhesive becomes too high, and the coatability is lowered. Specification, page 8, lines 11-14. These disadvantages arise when the number average weight exceeds 20,000.

b. Hasegawa neither describes nor would it have suggested the claimed range.

Hasegawa appears to refer to a number average molecular weight falling in a range of usually 1,000 to 1,000,000 (see col. 7, lines 9-12).

The huge range in Hasegawa should be deemed analogous to the well-established principle that a large chemical genus does not anticipate an unnamed species, nor render it obvious. Atofina v. Great Lakes Chemical Corp., 441 F.3d 991, 100, 78 U.S.P.Q.2d (BNA) 1417, 1424 (Fed. Cir. 2006) (In reversing the trial court's ruling of anticipation for a narrower range encompassed within a very broad generic range, the court said "there may be many species encompassed within a genus that are not disclosed by a mere disclosure of the genus."); In re Baird, 16 F.3d 380, 382, 29 U.S.P.Q.2d (BNA) 1550, 1552 (Fed. Cir. 1994) ("The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious."); In re Jones, 958 F.2d 347, 350, 21 U.S.P.Q.2d (BNA) 1941, 1943 (Fed. Cir. 1992) (rejecting Commissioner's argument that "regardless [of] how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it").

Moreover, Applicants invite attention to Hasegawa at column 28, Table 1. According to Hasegawa, the copolymers for coating agents produced in Production Examples 1-5 (see Hasegawa, column 18, Table 1) are produced by emulsion polymerization. Such copolymers are usually considered to have a high molecular weight, such as on the order of 500,000 to 1,000,000 in terms of number average molecular weight. Hasegawa's copolymers are not disclosed in Table 1 as having Applicants' claimed number average molecular weight range of about 2,000 to about 20,000. *See, e.g., Atofina, supra.*

In contrast to Hasegawa, and as disclosed in Appellants' specification, when the number average molecular weight is too high, the viscosity of the adhesive becomes too high, and the coatability is lowered. Specification, page 8, lines 11-14.

In short, Hasegawa does not describe the claimed range of about 2,000 to about 20,000, nor would Hasegawa have led, motivated, taught, suggested or implied the ranges in Applicants' claims.

4. Hasegawa neither discloses nor would it have suggested compounds having terminal maleimide groups.

There is no suggestion in the Hasegawa reference to modify its disclosure to reach Applicants' claim 3.

Applicants' specification describes an aspect of claimed invention in which compounds represented by Applicants' formula 1 possess the maleimide groups at the terminus of the compound. Attention is invited to what are understood to be working Examples of the claimed compounds and description at page 9, lines 1-12. This aspect of the invention is reflected in the claims, including claim 3 as an example.

In contrast, Hasegawa does not disclose a product or compounds in which a maleimide group is at a terminal end(s) or the terminus. Rather, Hasegawa discloses polymerizing ethylenically unsaturated monomers having a maleimide group, and thus apparently discloses only polymers that possess the maleimide groups on side chains.

In short, Hasegawa would not have led, suggested, taught, or motivated a person of ordinary skill in the art to undertake the necessary molecular changes – in synthesis too – to reach the subject matter of Applicants' claim 3.

5. It does not appear that Hasegawa describes or would have suggested Applicants' "polyester" compounds.

Applicants respectfully suggest the Examiner should reconsider and withdraw the rejection for another reason. To wit, at page 3 of the Office Action, the Examiner apparently mistakenly expresses the view that Hasegawa teaches copolymer (I) would inherently have a polyester backbone.

It seems from the context that the Examiner may be referring to monomers, which are not polyester type compounds. For instance, monomers a) and c), such as imide(meth)acrylates, alkyl(meth)acrylates and hydroxyalkyl(meth)acrylates are not polyesters. A polyester may be understood as $(\text{RCO-OR}'\text{O-CO})_n$ in which R represents a dicarboxylic acid residue, R' represents a diol residue, and n is the number of repeating units.

In another aspect, in a pressure-sensitive adhesive curable with an active energy beam in accordance with Applicants' invention the specified adhesive is a compound having a polyester skeleton. The compounds having a polyester skeleton are preferred because they are excellent in pressure-sensitive adhesive strength. Specification, page 23, lines 4-6.

B. Claims 1-3 and 5-7 Define Novel Inventions over the Okazaki Reference.

Applicants submit their claims 1-3 and 5-7 define unobvious inventions over the Okazaki reference, U.S. Patent No. 6,645,617 B1.

Applicants' submit that Okazaki does not disclose the elements of claims 1-3 and 5-7 – which necessarily must be the case since there is no anticipation rejection, and that it would not have suggested the inventions as claimed to a person of ordinary skill in the art. Okazaki does

not necessarily disclose the compound in which R1 is hydrogen and R2 is an alkyl as in the present Formula (1), does not disclose the compound represented by the present Formula (1) that is liquid at ordinary temperatures, and does not disclose the compound represented by the present Formula (1) has a number average molecular weight of about 2,000 to about 20,000.⁴

1. **Okazaki neither describes nor would it have led to the claimed compound.**

At the beginning, it appears the rejection requires a selection from the choices presented in the Okazaki reference.

The Examiner contends Okazaki discloses a pressure sensitive adhesive composition curable with active energy beams which comprises a copolymer obtained from an ethylenically unsaturated monomer having a maleimide group and another ethylenically unsaturated monomer, and a pressure sensitive adhesive sheet formed of the above composition on a substrate.

As in Hasegawa, Okazaki broadly discloses cases (i) in which R1 and R2 are both hydrogen, (ii) R1 is an alkyl and R2 is an alkyl, (iii) one of R1 and R2 is alkyl while the other is hydrogen, or (iv) R1 and R2 form a ring. However, Okazaki does not specifically exemplify a compound as claimed in the present application that has the present Formula (1) in which either of R1 and R2 is hydrogen. See, col. 2, line 33 through col. 3, line 33 of Okazaki. Okazaki generally discloses a Formula (1) but does not restrict it to R1 is hydrogen and R2 is alkyl.

Even if the ‘formula’ in Applicants’ independent claim 1 and independent claim 5 was found in the Okazaki disclosure, the claims are not to a formula but are to a pressure-sensitive

⁴ Applicants submit the Office Action has not presented a *prima facie* case. There is *no* factual predicate to show Okazaki disclosed the compound, disclosed the compound is liquid, or, for instance, disclosed that the compound has a number average molecular weight according to Applicants’ claims, nor is there a factual predicate for an obviousness rejection.

adhesive (claim 1) and to a pressure-sensitive adhesive sheet (claim 5) in which the compound recited is liquid at ordinary temperatures and has a number average molecular weight of 2,000 to 20,000.

2. Okazaki does not disclose or suggest the compound is liquid at ordinary temperatures or Applicants' claimed molecular weight ranges.

Applicants' independent claims 1 and 5 recite the compound is liquid at ordinary temperatures and has a number average molecular weight of 2,000 to 20,000. These claim limitations would have been unobvious in view of Okazaki.

a. Okazaki refers to solutions, but not to a compound that is liquid at ordinary temperatures, and the latter would have been unobvious.

Applicants' liquid materials would not have been suggested by the Okazaki liquid materials. This follows from *In re Cofer*, 148 USPQ 268 (CCPA 1966). Okazaki therefore would not have made this or the claim limitations obvious to a person of ordinary skill in the art.

Okazaki does not disclose a compound as recited in Applicants' claims that is liquid at ordinary temperatures. Instead, Okazaki discloses making solutions (Examples) and describes a solvent type pressure-sensitive adhesive (column 5, line 45). Solutions and the like can be made using a solvent and dissolving solid materials therein. Therefore, the Okazaki reference does not appear to disclose the compound is liquid at ordinary temperatures.

On the other hand, Applicants' pressure-sensitive adhesive composition and pressure-sensitive adhesive sheets contain maleimide compounds that are liquid at ordinary temperature. Specification, page 7, lines 22-23. Ordinary temperature can be approximately room temperature, and can be referred to as 25°C. Specification, page 8, lines 2-4. Since the

compounds are liquid at ordinary temperature, it is easier to handle such compounds in coating operations. Specification, page 7, lines 23-24; page 35 lines 23-24.

In comparison, compounds that are solid at room temperature are not easy to handle, and additionally, lead to a high elastic modulus of the cured film and thus to insufficient adhesive performance. Specification, page 7, line 24 to page 8, line 2.

b. Okazaki would not have suggested Applicants' molecular weight range.

The range in Okazaki is of such breadth as to be analogous to the well-grounded principle that a chemical genus does not anticipate an unnamed species, nor render it obvious. Atofina, 441 F.3d at 100, 78 U.S.P.Q.2d (BNA) at 1424 (In reversing the trial court's ruling of anticipation for a narrower range encompassed within a very broad generic range, the court said "there may be many species encompassed within a genus that are not disclosed by a mere disclosure of the genus."); In re Baird, 16 F.3d at 382, 29 U.S.P.Q.2d (BNA) at 1552 ("The fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious."); In re Jones, 958 F.2d at 350, 21 U.S.P.Q.2d (BNA) at 1943 (rejecting Commissioner's argument that "regardless [of] how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it").

Okazaki discloses a broad weight average molecular weight range but does not disclose the the compound has a number average molecular weight of 2,000 to 20,000. Okazaki discloses a broad range of molecular weight between 10,000 and 1,000,000 (see column 5, lines 45-52). Okazaki discloses that the molecular weight of the copolymer is "more preferably 100,000 to 1,000,000 in terms of weight-average molecular weight." Column 5, lines 47-48.

Okazaki does, however, disclose a number average molecular weight (M_n) for copolymers obtained in the working examples (see column 12, Table 1). The copolymers as reported had a number average molecular weight (M_n) of from 40,000 to 52,000.

As disclosed in Applicants' specification, when the number average molecular weight is too high, the viscosity of the adhesive becomes too high, and the coatability is lowered. Specification, page 8, lines 11-14.

In short, Okazaki does not describe the molecular weight range of the present invention and would not have suggested the range to a person of ordinary skill in the art.

3. Okazaki does not disclose compounds having terminal maleimide groups.

Applicants' specification describes an aspect of claimed invention in which compounds represented by Applicants' formula 1 possess the maleimide groups at the terminus of the compound. Attention is invited to what are understood to be working Examples of the claimed compounds and description at page 9, lines 1-12. This aspect of the invention is reflected in the claims, including claim 3 as an example.

In contrast, Okazaki does not disclose compounds in which a maleimide group is at a terminal end(s) or the terminus of the compound. Rather, Okazaki discloses polymerizing ethylenically unsaturated monomers having a maleimide group, and thus apparently discloses only polymers that possess the maleimide groups on side chains.

Okazaki nowhere appears to teach, suggest, motivate towards modifying its own procedures to reach Applicants' compounds generally, and certainly does not specifically teach the modifications to arrive at Applicants' compounds.

Response
Application No. 10/505,409

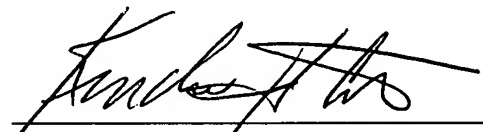
Atty. Docket No. 7378/84103

Conclusion

Applicants' respectfully solicit favorable consideration of their application and a Notice of Allowance.

Respectfully submitted,

Fitch, Even, Tabin & Flannery



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APPENDIX – In Re Cofer

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In re Cofer

148 USPQ

counting for profits and damages as prayed for in the complaint. Counsel are requested to confer to determine whether the amount due Philip Morris can be stipulated. The stipulation, of course, would be received without prejudice to the position taken by the parties on all other issues in the case. If the parties can not reach this stipulation the issue will be set for hearing or referred to a master.

24. Imperial's counterclaim will be dismissed with prejudice.

[12] 25. Philip Morris is entitled to recover its costs to be taxed by the Clerk of this Court. Philip Morris is not entitled to attorneys' fees as there is no evidence of bad faith or fraud on the part of Imperial. *Century Distilling Co. v. Continental Distilling Corp.*, 205 F.2d 140, 149, 98 USPQ 43, 51 (3rd Cir. 1953); *Williamson-Dickie Mfg. Co. v. Davis Mfg. Co.*, 149 F.Supp. 852, 855, 112 USPQ 383, 385 (E.D. Pa. 1957), *aff'd*, 251 F.2d 924, 116 USPQ 303 (3rd Cir. 1958).

53 CCPA

Court of Customs and Patent Appeals

In re COFER

Appl. No. 7449 Decided Jan. 13, 1966

PATENTS

1. Patentability—Composition of matter (§ 51.30)

Pleading and practice in Patent Office—Rejections (§ 54.7)

There being no explanation by Board or examiner as to why it should be found from references or from common knowledge that a person skilled in the art would regard free-flowing crystals of specific compound to be obvious, court is not free to search for speculative reasons that might support rejection, when it is apparent that Board and examiner used references to show that compound was known as a viscous liquid and not to suggest that crystalline form would also exist.

2. Patentability—Composition of matter (§ 51.30)

Cited cases fail to support proposition that merely changing form, purity, or another characteristic of old product, the utility remaining the same as that of old product, does not render claimed product patentable; materials found in cited cases were found unpatentable

where alleged differences in form or purity of those substances were either disclosed or inherent in, or rendered obvious by, prior art.

3. Patentability—Composition of matter (§ 51.30)

Patentability — Invention — In general (§ 51.501)

Patentability — Invention — Law or fact question (§ 51.507)

Facts in record, rather than prior decisions in and of themselves, must support legal conclusion of obviousness under 35 U.S.C. 103; merely stating that compound or composition is obvious, without adequate factual support, is not sufficient.

4. Patentability—Composition of matter (§ 51.30)

Whether chemical compound or composition has same usefulness as closely related materials may be an important consideration in determining obviousness under 35 U.S.C. 103, but it is only one consideration; other facts which must be given weight in determining whether subject matter as a whole would have been obvious are whether prior art suggests particular structure or form of compound or composition as well as suitable methods of obtaining that structure or form; new form of compound set forth in claims is as much a part of "subject matter as a whole" to be compared with prior art as are other properties of material which make it useful.

5. Court of Customs and Patent Appeals —Record (§ 28.30)

Evidence—Judicial notice (§ 36.20)

Solicitor's reliance on allegedly standard textbook on chemistry as support for Patent Office position illustrates a growing tendency on part of appellants and Office to impair clear and specific language of 35 U.S.C. 144, which requires court to determine appeal on evidence produced before Office; record on which parties must stand or fall is that made in Office; in most cases, particularly in chemical field, appeals are sufficiently complex without counsel bringing in technical data, which, if relevant, should have been submitted below; it is not appropriate to take judicial notice of specific textbook since it relates to technical and empirical area of chemistry and court has no independent way of evaluating its repute and notoriety in the art.

Particular patents—Diepoxide

Cofer, High Purity Diepoxide, claims 1 and 8 of application allowed.

Appeal from Board of Appeals of the Patent Office.

Application for patent of Kenneth B. Cofer, Serial No. 14,497, filed Mar. 14, 1960; Patent Office Group 420. From decision rejecting claims 1 and 8, applicant appeals, Reversed.

JAMES H. PARKER, Emeryville, Calif., and EDWARD B. BEALE, Washington, D.C. (MARTIN S. BAER, Emeryville, Calif., of counsel) for appellants.

CLARENCE W. MOORE (JOSEPH SCHIMMEL of counsel) for Commissioner of Patents.

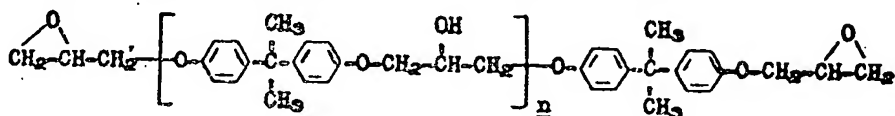
Before WORLEY, Chief Judge, and RICH, MARTIN, SMITH, and ALMOND, Associate Judges.

WORLEY, Chief Judge.

This appeal is from the decision of the Board of Appeals affirming the examiner's rejection of claims 1 and 8 in appellant's application¹ entitled "High Purity Diepoxide."

The subject matter is reflected in claims 1 and 8:

1. As a manufacture, free-flowing



Those compounds are produced by the reaction of epichlorohydrin with 2,2-bis(4-hydroxyphenyl) propane, the latter compound also being known as "Bisphenol A." The simplest addition product formed in that reaction is 2,2-B, resulting from a combination of two parts epichlorohydrin and one part "Bisphenol A." Higher molecular weight diepoxides which contain epichlorohydrin and "Bisphenol A" in ratios of 3:2, 4:3 and the like, are also formed in that reaction. By appropriate control of the ratio of epichlorohydrin to "Bisphenol A" in the reaction, complex liquid mixtures which contain a relatively high proportion of 2,2-B, e.g. 70% to 90% of the total reaction product, can be produced. According to appellant's specification no method has yet been described which permits production of pure 2,2-B directly by the reaction of epichlorohydrin with "Bisphenol A." Prior attempts to recover 2,2-B have resulted only in recovery of a relatively viscous liquid containing impurities which adversely affected the usefulness of epoxy resins prepared therefrom.

Appellant has found that substantially pure 2,2-B is capable of existing in crystalline form and can be recovered

crystals of 2,2-bis (2,3-epoxypropoxyphenyl) propane.

8. As a manufacture, free-flowing crystals of substantially pure 2,2-bis (2,3-epoxypropoxyphenyl) propane characterized by a sharp melting point of about 43.5°C, a weight-to-epoxide ratio of about 170 grams per gram equivalent epoxide, total chlorine content of less than 0.1 percent by weight, saponifiable chlorine content of less than 0.01 percent by weight, total hydroxyl content and phenolic hydroxyl content of less than 0.01 gram equivalents per 100 grams, each, and a viscosity, when a supercooled liquid, of less than about 40 poises at 25°C.

The compound of the claims, 2,2-bis (2,3-epoxypropoxyphenyl) propane [also known as the diglycidyl ether of 2,2-bis (4-hydroxyphenyl) propane and hereinafter termed 2,2-B] is well known to those skilled in the art as useful in the preparation of thermosetting epoxy resins. The compound is the simplest member ($n=0$) of a family of diepoxides of the formula

ered from certain concentrates of the compound using controlled crystallization methods.² The free-flowing crystals are disclosed to be advantageous with respect to handling convenience and, when combined with the usual amine or anhydride curing agents, are said to produce thermoset epoxy resins equal or superior to those produced from the liquid 2,2-B compositions.

The references are:

Werner et al. 2,467,171 April 12, 1949.

Bender et al. 2,506,486 May 2, 1950.

Havens 2,530,353 November 14, 1950.

Dearborn et al. Ind. and Eng. Chem., Volume 45, pages 2715-21 (1953).

Werner, Bender and Dearborn all name the compound 2,2-B, and characterize it as a liquid. Werner, for example, discloses that both stereoisomers of 2,2-B were recovered in the form of "water white somewhat viscous liquids." Bender

² The examiner stated that "the Patent Office has recognized his contribution to the art by allowing claims drawn to methods of crystallizing and recovering" crystalline 2,2-B in other patent applications.

¹ Serial No. 14,497, filed March 14, 1960.

discloses a 90.6% concentrate of 2,2-B to be a "viscous liquid (5000 centipoises at 25° C)." Dearborn states that epoxy resins having the structure depicted earlier in this opinion are "liquid or solid depending on the degree of polymerization, indicated by n," and that 2,2-B is an "amber liquid." Havens discloses 2,2-B as a stabilizer for resins.

Up to the time of his Answer, the examiner's rejection of the claims appears to have been founded on two separate grounds. In the final rejection the examiner stated:

Claim 1 is again rejected as unpatentable over Werner et al., * * * Dearborn et al., Havens and Bender et al., all of record and which disclose the diglycidyl ether of Bisphenol A. Whether or not applicant considers the free flowing crystals of the claimed compound as a product of manufacture or as a compound per se is immaterial; the fact remains that crystalline 2,2-bis(2,3-epoxypropoxyphenyl) propane is deemed to be obvious as merely directed to an old compound in a crystalline form. * * * Furthermore, although the art cited does not specifically teach the production of the crystalline compound the art does teach the production of other closely related glycidyl ethers of hydroxy phenylalkanes, in crystalline forms and therefore it is deemed to be suggested that the crystalline form of this glycidyl ether would exist in crystalline form under sufficiently conducive conditions. The claimed crystalline compound is thus rendered obvious, 35 U.S.C. 103.

In subsequent traversal of the examiner's position that the existence of closely related glycidyl ethers of hydroxyphenylalkanes in crystalline form would suggest that 2,2-B, the diglycidyl ether of 2,2-bis(4-hydroxyphenyl) propane, would also exist in crystalline form, appellant filed an affidavit of one Kelly to demonstrate that other glycidyl ethers bearing close relationship to 2,2-B do not exist in crystalline form.

Subsequently, in his Answer, the examiner said:

Claims 1 and 8 stand subject to the Final Rejection as lacking invention over any of the Werner et al., Havens, Bender et al. or Dearborn et al. references, all of which disclose the claimed compound in its normal form, viz. a viscous liquid. Appellant does not dispute this. The claims are directed to a more pure form of the disclosed compound which has been made to crystallize and is claimed in

its crystalline form as a manufacture. The claimed compound is not patentable because it is taught by the prior art and is obvious, 35 U.S.C. 103. * * *

* * *

The basis for the rejection is, essentially, that the claimed product is merely a different form of a known compound, and, notwithstanding that some desirable results are obtained therefrom, since the product has the same utility as the art compound; the claimed product is deemed to be unpatentable thereover. * * *

* * *

The examiner's suggestion in the Final and Advisory actions given with respect to the obviousness of the instant crystallized product, because of the fact that analogous compounds are known to exist in crystalline form, * * * is withdrawn as being superfluous and not determinative of the essential issues involved in this case. The affidavit of * * * Kelly submitted by applicant * * * is consequently considered to be moot, as the behavior of analogous compounds with regard to susceptibility of crystallization of the instant compound is considered to have no controlling bearing upon the essential issues of this case. From a factual viewpoint, for whatever it is worth, applicant has shown that four related compounds are not susceptible to crystallization by the methods employed whereas the art shows that certain other related compounds are normally recoverable in the crystalline form.

The board was of the view, and we agree, that:

The sole determinative issue here is whether the claimed product, which is free-flowing and crystalline in form, is obvious, under 35 U.S.C. 103, where the prior art discloses the same compound in its normal form, i.e., as a viscous liquid.

The board observed that:

Appellant points to the various advantages of his product as compared to the prior art compound, such as better color, high epoxy content, lower impurity content, easier to handle in preparing epoxy resins therefrom, better electrical properties, and long shelf life. * * *

After a brief discussion of the respective contentions of the examiner and appellant, the board referred to its decision in *Ex parte Hartop*, 139 USPQ 525,

as "clearly apposite to the present factual situation," stating:

* * * We note that the decisions relied on herein, by both the appellant and the examiner, are discussed therein, and we deem it unnecessary to discuss these again. The conclusion reached therein to the effect "*that merely changing the form, purity or another characteristic of an old product, the utility remaining the same as that for the old product, does not render the claimed product patentable*," is clearly applicable to the factual situation herein, and we will accordingly adopt it here. As pointed out by the examiner, the prior art resins in viscous liquid form, have the same utility as the claimed crystalline compound, viz., for use in the preparation of synthetic resins, the difference in properties, therebetween resulting only from a greater degree of purity, and, therefore, to be expected. [Emphasis supplied]

Appellant argues that his claims have been rejected solely because his new manufacture is said to have "the same utility" as the known liquid, and that the record is devoid of any express support for a finding by either the examiner or board that the new physical form of 2,2-B would be obvious. He urges that the board did not give sufficient weight to the pertinent facts of this case, but held, *as a matter of law*, that a free-flowing crystalline form of a product heretofore known only as a liquid would be obvious under 35 U.S.C. 103.

[1] We think the record supports those contentions. There is no explanation in the views of the board or examiner why it should be found from the references or from common knowledge that a person skilled in the art would regard free-flowing crystals of 2,2-B to be obvious. In such circumstances, we are not free to search for speculative reasons that might support the rejection, when it is apparent from those opinions that Werner, Bender and Dearborn were ultimately used only to show that 2,2-B was known as a viscous liquid, and not to suggest that the crystalline form would also exist. Indeed, the examiner withdrew his initial finding that the cited prior art would suggest that 2,2-B could exist as crystals after the Kelly affidavit was filed. The board did not discuss that phase of the original rejection.

[2] The board seemingly regarded the question whether appellant's product had the same or different utility as dispositive of the issue here, relying on

the discussion of prior case law in Hartop. We see no need to review the cases relied on there save that each case must stand on its own facts. The cited cases fail to support the broad proposition that

* * * merely changing the form, purity or another characteristic of an old product, the utility remaining the same as that for the old product, does not render the claimed product patentable. * * *

We think examination of the decisions relied on here and in Hartop will demonstrate that the materials involved therein were found unpatentable where the alleged difference in form or purity of those substances was either disclosed or inherent in, or rendered obvious by, the prior art of record. Necessarily [3] it is facts appearing in the record, rather than prior decisions in and of themselves, which must support the legal conclusion of obviousness under 35 U.S.C. 103. Merely stating that a compound or composition is obvious, without adequate factual support, is not sufficient.

[4] To be sure, whether a given chemical compound or composition has the same usefulness as closely related materials may be an important consideration in determining obviousness under 35 U.S.C. 103. But it is only one consideration. We think the board failed to address itself to other factors which must be given weight in determining whether the subject matter as a whole would have been obvious, namely, whether the prior art suggests the particular structure or form of the compound or composition as well as suitable methods of obtaining that structure or form. The new form of the compound set forth in the claims is as much a part of the "subject matter as a whole" to be compared with the prior art as are other properties of the material which make it useful.

[5] Apparently recognizing the deficiency in the record before us, the solicitor has devoted a considerable portion of his brief to reasons, accompanied by references to a textbook, which purport to establish obviousness of the crystalline form of 2,2-B and the techniques employed in obtaining the crystals. We look upon those contentions as but an attempted revival of the arguments which were abandoned by the examiner and not mentioned by the board. The solicitor's reliance here on an allegedly standard textbook on chemistry as further support for the Patent Office position illustrates a growing tendency on the part of appel-

lants and the Patent Office alike to impair the clear and specific language of 35 U.S.C. 144, which requires us to determine the appeal "on the evidence produced before the Patent Office." Insofar as the record shows, that textbook was not the subject of discussion between appellant and the Patent Office, hence is not such "evidence." We would remind counsel for *all* parties that the record upon which they must stand or fall on review here is that which is made in the Patent Office. In most cases, particularly in the chemical field, appeals are sufficiently complex without counsel on either side bringing in, at this late date, technical data which, if relevant, should have been submitted below. Nor do we think it appropriate in the present case to take judicial notice of that textbook, for it appears to relate to a highly technical and empirical area of chemistry and we have no independent way of evaluating its repute and notoriety in the art.

We find the record fails to support a holding that those skilled in the art should have known that 2,2-B would exist in crystalline form or that it would be known how to obtain such crystals. We think it improper to presume such knowledge under the circumstances. In *re Williams*, 36 CCPA 756, 171 F.2d 319, 80 USPQ 150. Compare In *re Adamson*, 47 CCPA 839, 275 F.2d 952, 125 USPQ 233.

The decision is *reversed*.